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**CENTRAL
INTELLIGENCE
AGENCY**

Program Memorandum

FY 1970-1974



RESEARCH, DEVELOPMENT & ENGINEERING

**DD/S&T
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DRAFT

JUNE, 1968

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CENTRAL INTELLIGENCE AGENCY

DRAFT

PROGRAM MEMORANDUM

FOR

RESEARCH, DEVELOPMENT, AND ENGINEERING

FY 1970 - FY 1974

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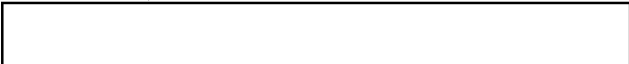


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RESEARCH, DEVELOPMENT, AND ENGINEERING

I. SUMMARY

The goal of the Agency's Research, Development, and Engineering Program is the imaginative and innovative application of modern technology to provide the new techniques and devices which are required to support the Agency's and the Intelligence Community's missions.

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Collection Systems now in being

will provide ^{the necessary} an effective basic arsenal of

^{capability only} collection if we maintain and improve their utility. For this reason, we project

The net decrease in R&D resource requirements for Collection Systems over the ILLEGIB

planning period

reduce the

Prior years' ^{limitations} reductions in resources for Information Processing/Intelligence

Production R&D, together with the increasing flow and complexity of information from oncoming systems, requires that vigorous attention be given to this problem.

The flood of data which will have to be processed and analyzed in the near future could overwhelm the Intelligence Community unless adequate tools and techniques are provided. ^{cannot be effectively exploited by} ^{more effective} Resources for Information Processing/Intelligence

^{anticipating} Production R&D are planned to increase steadily through the five-year period.

ILLEGIB. Similarly, the increasing Communications operational workload will continue to require R&D support both for the development of equipment, processes and techniques, of communications and to assure the security of these communications. Resources for Communications R&D will remain relatively level with ^{except for} only nominal cost-of-doing-business increases.

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Add a lot about
early consideration of alternatives

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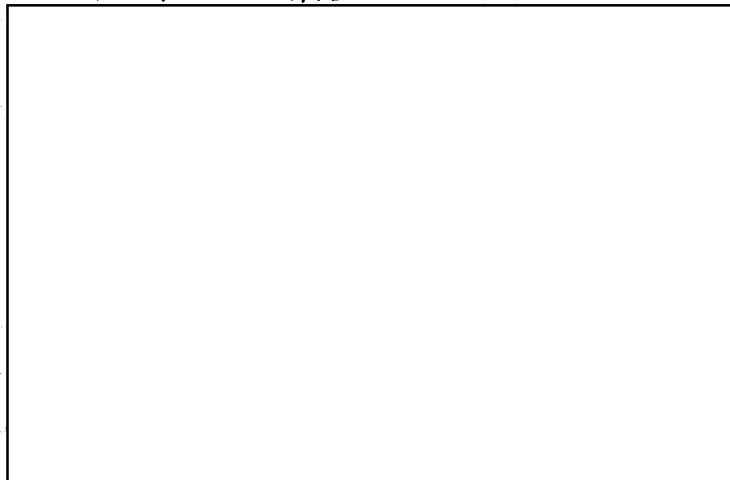


Although the Research and Development Program rises in FY 1971 and FY 1972, it remains level over the remainder of the planning period. This program is thus designed to provide the minimal acceptable level of effort ^{and distribution} which is required to support the Agency's basic missions and assure that it will not be technologically out of date.

Program and Financial Plan
Research, Development, and Engineering
 FY 1970 - FY 1974

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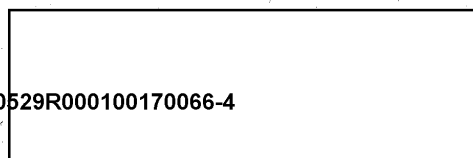
Collection Systems
 Intel. Production/
 Info. Processing
 Communications
 Other R&D
 TOTAL



The Research & Development Program shows the "Bowl" wave typical of R&D plans. In this plan this initial increase in FY 71 and 72 reflects a restoration of explanatory development effort which has been recent budgets have precluded and the large expenditures required to reduce ^{equipment} engineering development equipment to an operational status have precluded.

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II. PROGRAM PLANS

^{effectiveness} ~~the~~ CIA
 The success of this Agency and the rest of the Intelligence Community in ^{will increasingly depend upon well planned and executed}
~~the foreseeable future is tied solidly to the capability of RD&E efforts to keep~~ ^{adapt and}
~~exploit~~ ^{technology to the needs of...}
~~abreast of technological advances within American and foreign industry. We~~ ^{intelligence collection, processing, & production}
~~must innovate~~ ^{on and creativity, together with adequate exploratory experimentation}
~~new techniques and devices that are in advance of the capability~~
~~will be required to~~ ^{the}
~~of Communist nations and we must develop these products of imagination into~~
~~needed for~~ ^{It is anticipated that}
~~usable intelligence gathering and producing devices. As in the past, such~~ ^{the}
~~rising costs of RD seen in other sectors will also have to be~~ ^{the Agency}
~~efforts will not be inexpensive (although we intend to hold our efforts to modest~~
~~RD&E effort as devices and systems become increasingly complex. However,~~
~~increases in view of anticipated budgetary restraints), but it must be realized~~
~~the effectiveness of the devices produced~~ ^{is also expected to increase at a}
~~that Agency R&D work is for the benefit of the entire Intelligence Community.~~
~~rate exceeding that of the cost.~~ ^{the unexpected, i.e., a variety}
 In the five years covered by this memorandum we can expect ~~many and varied~~
~~of technical advances~~ ^{in other government & civil sectors.}
~~advances made possible by the RD&E program and by its interfaces with~~
~~American industry. In many instances these advances will be the products~~
~~of a technology which has become highly complex, largely automated and~~
~~dependent upon a great deal of managerial acumen. This increasingly intricate~~ ^{the ability to react to needs and opportunities}
~~management problem is being~~ ^{improved by} ^{methods}
~~met with new systems designed to exercise~~
~~more effective control over the total RD&E program of the Agency. These~~ ^{coordination of}
~~management devices will be discussed in Part III of this report.~~ ^{actions are}

The funding levels of the RD&E program as approved by the Director
 range from in FY 1970 to a high of in FY 1973 and
 FY 1974. ~~This is a moderate increase considering the rapid advances expected~~
~~in technology and the increasing dependence being placed upon SIGINT collection~~
~~devices and automated processing of the intelligence take.~~

~~below these resource levels would seriously impair our ability to meet~~
~~objectives of the highest priority~~ ^{these} ^{objectives}
 The rise in programmed R&D expenditures

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in FY 1971 and FY 1972 reflects the need to re-establish exploratory development which has been sacrificed for the past several years in order to bring systems from an engineering to operational status. The sub-category experiencing the greatest dollar and percentage ^{increases are in} changes is Intelligence Production/Information Processing ^{where} a major effort is ^{planned} to be undertaken in this area to ^{accelerate} the introduction of ^{data processors and} automated systems to aid analysts, ~~managers~~ and data processors to reduce the time required to screen, sort, file, recall, and analyze intelligence information who are already swamped with unprocessed data and faced with an ever increasing ^{This becomes increasingly important as the} flow as new intelligence collection systems ^{and developing areas increase the total amount} come into existence. ^{which must} ^{be handled}

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A. Collection Systems

The Agency's program to develop advanced collection systems is ^{now} divided

into five elements -- Audio, Imagery, Electromagnetic, Delivery Systems and

Accessories, and Other. These elements are now more output-oriented than

those used in previous program projections. ^{These} ^{are more descriptive and} This change in elements also per-

mits ^{move useful} better coordination from a technical point of view than the elements

previously used which reflected the operational mode of collection, i. e.,

Clandestine Collection, Covert Intercept, Overhead Reconnaissance, and Other

Technical Support. The Director has approved a Collection Systems RD&E

effort which has ^{more emphasis may be given to} from FY 1970 through FY 1974 so that ~~we may~~

apply ^{more resources} more resources to other sub-categories, principally Intelligence Production/

Information Processing and Communications. ^{During this period although} ^(B)

This year's proposal for FY 1970 ^(B) reflects some actual

reductions, and some transfers of funds to other sub-categories. The major

reductions resulted from ^(B)

program and lesser efforts in the exploratory developments in all of the

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B> *need for collecting*
 elements. ~~The increasing difficulty in collecting profitable and specific intelli-~~
 gence information in spite of formidable security and technological barriers
 makes an increase in Collection Systems R&D highly desirable. ~~On the other~~

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~~hand, we judge that collection systems in being~~

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~~collection means~~ *Current* ~~will provide an effective basic~~ *level of*

~~arsenal of collectors if we maintain and improve their utility. For this reason,~~

~~we have projected a gradually decreasing resource allocation for Collection~~

~~Systems over five years.~~

Funds are planned in FY 1970
~~FY 1970 planning includes funding for~~

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~~The level of obligations for Collection Systems remains~~

relatively stable over the planning period, but the mix will vary among the

elements as some systems become operational and others enter the experimental

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stage.

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B. Intelligence Production/Information Processing

The objective of this program is the development and incorporation of automatic processes to screen, process, and analyze the increasing volume of data which is available with greater effectiveness at lower cost.

~~Employing the recent past to forecast the future, it is evident that "hand~~ ^{the manual}
~~processing of intelligence information will become a completely impossible~~ ^{can not suffice for the} ^{Keep pace with}
~~the increasing information flow.~~ ^{and other sources} ^{entirely}
~~approach. As new collection devices pour a deluge of data into the production-~~
^{Data from}
~~processing mainstream, there will be no manner in which sufficient manpower~~ 25X1

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~~recruitment and processing~~ ^{training, and} ~~and~~ ^{will not provide adequate staffing to}
~~can be procured, trained, and physically accommodated~~ to keep abreast of
 the flow in the expeditious manner required by the Intelligence Community.
 Simultaneously, improved capabilities to search and retrieve information, to
 correlate data, and to make predictive analysis through the use of sophisticated
 analog and digital processes must be continued and expanded.

To support these processing and analysis requirements, the following
 RD&E effort is contemplated:

RD&E in the Scan and Sort Element is directed at two fundamental
 areas: the design and development of devices and techniques which can assist
 the image interpreter in making initial searches and classifications of increased
 amounts of photographic material, and the design and development of equip-
 ment and techniques to perform a similar function in terms of non-photographic
 information and data which is also increasing in volume. Heavy emphasis has
 been given in the past to the photographic problem, and a strong effort must
 be maintained here in order to effectively treat the products of new collection
 systems as they become operational. ^{On the other hand,} ~~However, a variety of factors contribute~~

~~to~~ the feasibility of introducing automatic devices in handling non-photographic
^{is simplified by several factors.} material. In particular, an increasing amount of ^{information} material is received in an
 electrical form~~at~~ which substantially reduces the effort required to automatically
 "read" this material. In addition, many promising advances have been made
 in the devices and programs ^{needed for} ~~available which are~~ adaptable to the solution of
 this problem. The ability to scan and sort non-photographic material can
 preclude a heavy manpower ^{requirement} ~~investment~~ in this important function.

Further improvement in storage and retrieval of data, and particularly
 in the physical handling of photographic materials is needed, and R&D effort
 is planned to improve this situation. Concurrently, improved techniques for
 the retrieval of supplementary information to assist the imagery interpreter
 will be explored.

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Aside from the physical size of the problem, the complexity of the non-photographic data base ^{are} makes improvements in the ability to search and retrieve mandatory, ^{it} is to be effectively exploited. Although exploratory effort is planned early in this planning period, this effort may have to be accelerated. Modeling, to permit system simulation studies, and predictive analysis efforts are planned for this period to ^{improve} enhance the Agency's capabilities in these important fields.

Development of dry processes is planned to reduce the time required to produce ^{photographs.} photographic materials for a variety of uses. Anticipating increasing cost in silver halide materials, the development of a non-silver printer processor and investigation of reusable reproduction media will be studied. Continuing effort in data presentation, particularly with regard to manipulation of this data, will continue.

Fundamental studies of the characteristics of images and the imagery interpretation process continue to provide a better identification of the key parameters which are critical in the design and development of imagery interpretation equipment. This fundamental effort will be continued. Engineering effort associated with the development of a high precision stereo comparator should be completed during this planning period.

C. Communications

Development with emphasis on automation of sensitive equipment capable of exploiting correlation and coherence techniques will be ^{emphasized} continued during this time period to ^{improve} assist in monitoring and assessing Agency communications ^{the potential vulnerability of} in terms of its potential vulnerability.

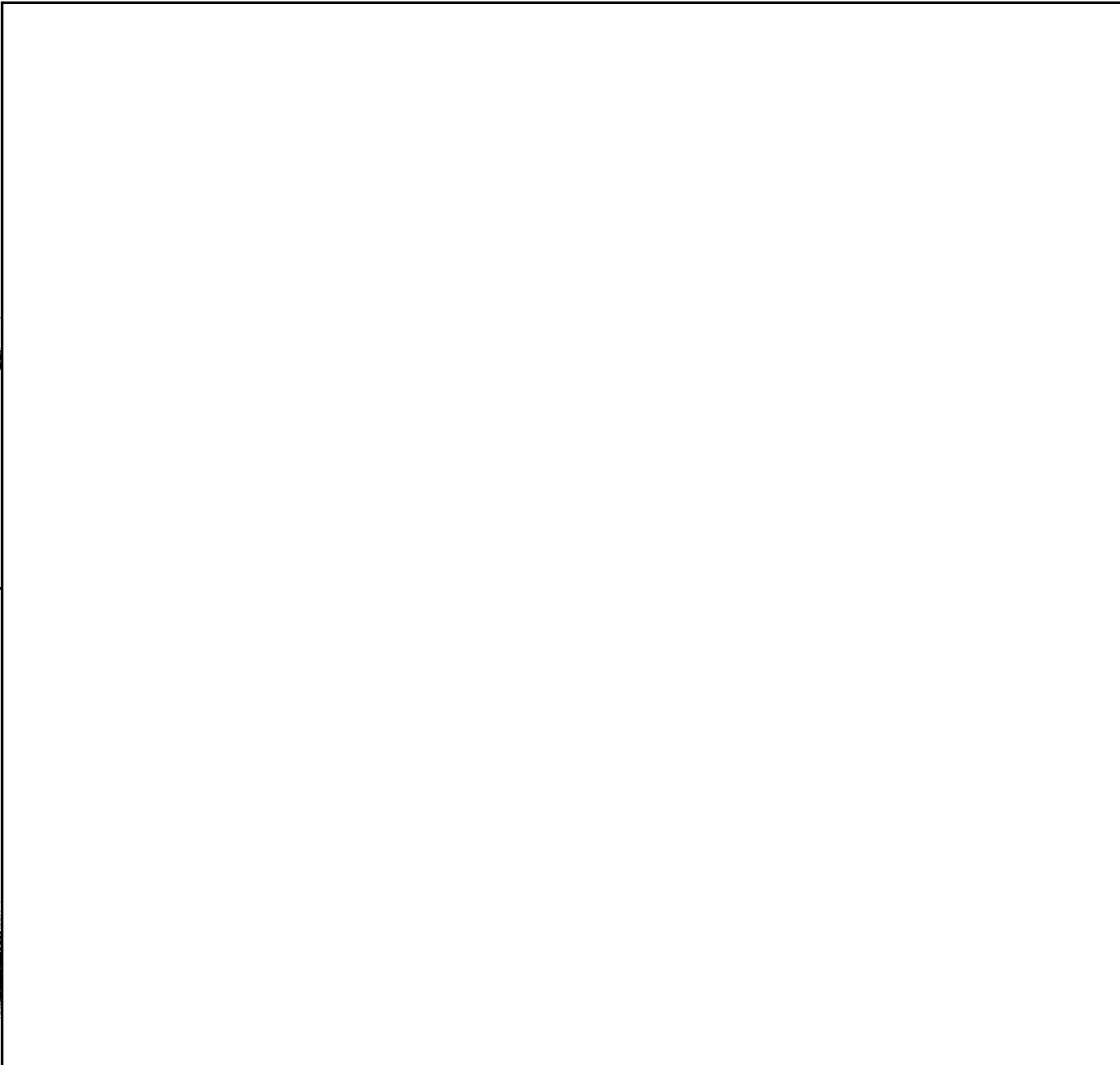
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~~In addition,~~ In anticipation of the introduction of time-sharing access to common data files maintained within the Intelligence Community, detailed engineering studies must be initiated now in order to prepare for this capability.

D. Other R&D

This sub-category has been reduced substantially from the amounts proposed in the FY 1969-FY 1973 Memorandum, largely ^{because} ~~due to a portion of its~~ ^{it has been established as a} ~~efforts being relocated in the~~ Communications sub-category.

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B. Programming of R&D throughout CIA

Research and Development as ~~such~~ is not an Agency goal or mission.

CIA ~~does not~~ ^{rarely sponsors} undertake basic research, but rather ^{adopts new technologies and improves} ~~capitalizes on basic research~~ ^{as they emerge to the Agency's needs,} ~~done by others to develop the necessary technologies.~~ The purpose of CIA's

R&D program is to ~~assist by~~ ^{providing the} ~~tools,~~ ^{required equipment and techniques} through the imaginative and innovative ~~use of scarce resources;~~ ^{development of} to develop new techniques and devices which will be used in supporting the Agency's mission of intelligence collection, intelligence production, and covert action.

~~Numerous management steps have been made and efforts will continue to ensure~~ ^{Numerous management steps are employed to assure} that the Agency's R&D is ^{responsive to the} ~~closely attuned to~~ intelligence requirements. The requirements themselves are also subjected to continuing review ^{to provide of their} ~~to see that they~~ ^{relationship to} ~~assurance that they are directly related to this Agency's mission,~~ reflect a valid substantive need and are assigned appropriate priority. Effective response to the need for new techniques and devices requires good communications between the R&D elements and the users, particularly when quick reaction is required.

The close organizational relationship between CIA's R&D offices and user offices ^{facilitates this common process,} ~~has allowed us to achieve the effective communication required.~~

^{improve the} ~~During the past two years specific steps have been taken to eliminate~~ ^{additional} ~~duplication between the Agency's R&D offices and to provide a system and procedure~~ ^{among the various offices.} for coordination and cooperation in areas of mutual concern and interest. Formal designation of the DD/S&T as the responsible official for Agency-wide R&D

coordination in August 1967 has resulted in significant improvement in the coordination and review of R&D planning and programming. ^{Joint} ~~Inter-directorate~~ ^{planning} ~~of the R&D program now occurs~~ ^{this also} ~~as part of PPBS~~ ^{achieving complete} ~~and have been instrumental in integration~~ ^{of the} ~~of the R&D programs and in eliminating duplication and overlap.~~ The identification of Key specialists in specialized fields of work ~~has also provided means for detailed~~

^{have been identified, and this provides a}

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coordination of technical efforts. Other ^{actions} ~~factors~~ such as the establishment of
the Contract Review Board, a Project Officer's Manual, and the implementation
of an automated Contract Information System have also ^{helped} ~~aided~~ to promote better
Agency-wide communications and consistent practices in the R&D program.

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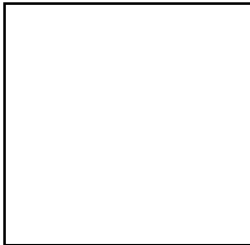
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